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To: Federal Communications Commission
Washington, DC.

Ref: RM-10811

Gentlemen:

A number of petitions are currently before the Federal Communications Commissions recommending both the retention and elimination of the radiotelegraph exams for the Amateur Radio Service. The following comments are submitted on behalf of the membership of the Michigan Net, "QMN," one of the nation's longest continuously operating Amateur Radio emergency service networks.

Background:

The Michigan Net, founded in 1935, operates a statewide communications network serving a wide variety of state and local agencies, including, but not limited to, the American Red Cross, The Michigan State Police Emergency Management Division, National Weather Service, and a variety of local emergency management agencies.

The Michigan Net employs a variety of telecommunications modes to accomplish this important mission. These modes include:

- A VHF wireless data network (packet radio) constructed and maintained by QMN members with assistance from local Amateur Radio Emergency Service programs.
- A High Frequency PACTOR data network operating on the 3.6 and 7.0 MHz high frequency bands for statewide and regional communications.
- High Frequency SSB as a supplementary mode for the collection of National Weather Service rain gauge and storm damage data.
- High Frequency radiotelegraph ("CW") networks for routine (daily) and emergency operations.

Our experience is probably unique within the Amateur Radio Service, as our organization utilizes many of the common digital and analog modes currently in widespread use in this Radio Service. Furthermore, we utilize them on a daily basis to provide reliable, consistent public service communications utilizing the High Frequency spectrum. This experience has provide an excellent opportunity to see the value of the CW mode.

The value of radiotelegraphy ("CW"):

Over the past seven years, the Michigan Net has operated a statewide rain gauge network in support of the National Weather Service. This network collects both routine and emergency weather data on behalf of this important served agency. All commonly deployed modes are utilized to accomplish this task.

Our experience has provided us with a unique opportunity to observe the relative performance of radiotelegraphy(CW), voice (SSB), and data modes (HF and VHF) under widely varying propagation conditions on a daily basis. The results may be summarized as follows:

Radiotelegraphy (CW)

Radiotelegraphy has proven to be the most reliable High Frequency mode. In network operation, it offers the ability to transmit weather data and operational message traffic at rates often exceeding those of radiotelephone networks. Our radiotelegraph net often exceeds the efficiency of voice circuits by a ratio of more than three to one during a given time period. When propagation conditions degrade, the relative merit of the CW circuit increases dramatically. Example of this efficiency advantage, are provided elsewhere in this document.

Digital Modes

Digital modes offer few advantages over radiotelegraphy, other than ease of access and occasional simplicity of use. Message throughput on high frequency data networks, while appearing quite good in theory, often falls to levels comparable with voice or radiotelegraph nets due to a variety of limiting factors. Some of these factors include the obvious need to transcribe, input, process, read, and deliver message traffic at the transmitting or receiving end of a circuit at Emergency Operations Centers and similar facilities. Digital modes often prove cumbersome in network configuration as stations enter and leave a network as emergency or operational conditions require. On High Frequency circuits, degraded propagation conditions and interference occasionally results in digital modes becoming significantly less reliable than CW.

There are situations in which the speed of digital modes is a significant advantage. These situations, typically involve the transmission of files, or complex data needed during a disaster operation, a process that proves cumbersome on voice or CW networks. Data modes also offer significant promise for automation, but such techniques tend to make these networks more vulnerable to disruption in time of emergency.

Voice (SSB) Mode

Voice networks are the least reliable of systems. The use of voice modes for the transmission of message traffic proves quite cumbersome, often resulting in significant delays in time of emergency. As High Frequency propagation conditions degrade, the speed and utility of voice modes for public service communications degrades significantly. We have found that voice networks are rendered unusable several times per year on average due to propagation anomalies, interference, and other unforeseen circumstances. It is not uncommon during these situations to observe a CW net operating efficiently while high frequency voice communications is unusable.

While voice modes offer ease of access, and prove an excellent tool for general coordination and tactical communications, they cannot compare with CW when applied to the reliable transmission of third-party message traffic, particularly when propagation conditions are unfavorable.

Example One – "Y2K" Communications Activities:

This later point is extremely important. For example, during the "Y2K" emergency preparedness activity on January 1, 2000, voice networks proved unusable throughout most of the evening. As a result, CW was utilized to transmit the majority of status reports to our Michigan State Police Emergency Operations Center throughout the evening. These reports originated from critical locations, including Correctional Facilities, local Emergency Operations Centers, and law enforcement agencies. *Specifically, our radiotelegraph network transmitted 62 percent more traffic than comparable High Frequency voice networks in slightly over one third the amount of time.* Our High Frequency radiotelegraph network also transmitted 45 percent more traffic than VHF wireless data networks (packet radio) during the entire Y2K operation!

This difference of efficiency was surprising to many inexperienced Amateur Radio Operators as well as some professional personnel present on scene. It stands as ample testimony to the potential value of CW in time of emergency.

Example Two – Martinsville Indiana Tornado:

During the recent Martinsville Indiana Tornado, the loss of AC Mains, telephone service, and wireless networks in the area required the deployment of Amateur Radio resources. The author of this document, found himself faced with a request to transmit message traffic out of the area to points throughout the Midwestern United States.

A portable, battery powered high frequency transceiver was set up at an American Red Cross Shelter, along with a temporary antenna. When High Frequency voice modes proved unusable, communications was quickly established on CW circuits, resulting in rapid transmission and delivery of message traffic to distant locations.

It is important to point out that, had CW skills and capabilities been unavailable, this service would not have been delivered to this important served agency.

Why is CW being eliminated in other services?

Opponents of the radiotelegraph exams cite a variety of examples for their push to eliminate a basic knowledge of this valuable mode. Most commonly heard are references to the elimination or de-emphasis of radiotelegraphy within the military and maritime communities. What the opponents of the radiotelegraph examination conveniently fail to mention is the fact that the Department of Defense and maritime interests now have access to reliable satellite platforms capable of providing continuous communications at a variety of operational levels. The migration of these agencies away from High Frequency infrastructure has eliminated the need for radiotelegraph service.

It is important to note that no satellite capability of comparable reliability exists within the Amateur Radio Service! Therefore, any attempt to compare the requirements of the military, maritime, or commercial agencies to the Amateur Radio Service is moot!

Because the Amateur Radio Service is almost *entirely* dependent on High Frequency circuits for statewide, regional, national, and even International communications, it is important to identify this environment. The High Frequency environment is subject to solar flares, selective fading, geomagnetic storms, and similar propagation anomalies, all of which may decrease signal-to-noise ratio significantly and with little notice. These events often render analog voice modes and data circuits inoperative. Yet, as our experience with the Michigan Net indicates, radiotelegraph circuits often continue to function despite these potential disruptions.

The public service role of Amateur Radio is unique to the United States:

While the Amateur Radio Service has been widely utilized throughout the World for public service communications, the extensive reliance on *organized* Amateur Radio Emergency Service type programs is unique to North America. Our extensive relationship with a wide variety of emergency management and relief organizations, and the regular deployment of Amateur Radio resources in time of emergency is unheard of in many parts of the World.

The commonly heard attempts to justify the elimination of the radiotelegraph examinations based on the actions of other Countries are therefore not valid. Other nations do not have the extensive history of public service communications present in the United States. Therefore, attempts to compare the concerns or requirements for *reliable* High Frequency communications in other countries with those in the United States are also moot.

Radiotelegraphy is a common denominator:

Unlike a variety of other modes, radiotelegraphy is the ideal common denominator because of its extreme narrow-bandwidth nature and related efficiencies. In other words:

- Radiotelegraphy offers considerable efficiency because it is spectrum efficient and of extremely narrow bandwidth. This spectrum efficiency permits the use of low-power battery operated emergency transceivers during disaster situations. Voice communications typically requires significantly greater bandwidth, and therefore greater RF power output levels and related power consumption to accomplish a similar communications mission.

- All High Frequency equipment of modern manufacture is capable of radiotelegraph, or "CW" communications. The same cannot be said of the wide variety of digital modes deployed throughout the Amateur Radio Service, many of which require not only additional computer equipment, but also terminal node controllers and similar facilities.

The lack of a single, *reliable* common denominator is a serious issue for emergency preparedness and disaster response. Unlike radiotelegraphy, which is universally available at any functioning Amateur Radio Station, digital modes present a wide variety of limitations. Terminal software command structure varies from individual station to individual station. Whereas some stations may be equipped with a wide variety of digital capabilities, others may be equipped with only one or two modes. The vast majority of Amateur Stations still lack access to *any* digital mode. These limitations make it difficult, if not near impossible, for the Amateur Radio Service to standardize emergency network operations around a single digital capability.

Once again, this situation points out the fallacy of comparing the requirements of the Amateur Radio Service to those of military, maritime, or commercial organizations. These later organizations can enforce a high level of standardization and redundancy throughout their networks. Such characteristics as baud rate, keying methods (FSK, PSK, etc.), and computer processing platforms may be completely standardized throughout a network. Such standardization is impossible within the Amateur Radio Service due to the individual interests of a diverse group of operators.

In time of emergency, a competent, skilled radiotelegraph operator can be deployed to any functioning High Frequency equipped Amateur Radio station and establish rapid and effective communications. Most importantly, he will be able to do so even when propagation conditions do not support voice or data methods.

Is Amateur Radio a Hobby or a Service?

If Amateur Radio were simply a "hobby" with no specific public service mission, a lack of consistency between operating practices and capabilities would be irrelevant. Individuals could communicate with whomever they encounter at random, and however they please at convenient times when High Frequency propagation supports casual communications. Unfortunately, such rules do not apply in time of emergency, when one

may need to communicate with a specific station at a specific location, regardless of propagation conditions.

The presence of an extremely reliable common denominator, such as radiotelegraphy, insures that a minimum basic capability can be deployed throughout the United States in the event of a major national crisis or emergency in order to facilitate regional or national communications on High Frequency circuits.

The Amateur Radio Service exists today because it continues to provide timely, effective disaster communications when more complex infrastructure fails. Much of the survivability of the Amateur Radio Service is a direct result of simplicity and decentralization. Radiotelegraphy offers excellent reliability and survivability under the most severe conditions.

Radiotelegraphy supports International Communications:

CW offers another advantage unavailable in voice and data communications; the ability to overcome language barriers. Through the use of International Q-Signals and other operating protocols, CW permits operators of any nation to exchange basic information, whether for the sake of casual communications, experimentation, or in time of distress. Such universality does not exist with digital or voice modes.

In addition, the narrow bandwidth nature of CW facilitates long-distance (worldwide) communications at lower power levels and with compromise antenna systems. Amateurs who specialize in "DXing" (communicating with distant stations) will be quick to defend the merits of CW, as a 100 watt CW station will often compare favorably with voice stations operating nearer the 1000 watt level.

Why a basic knowledge of CW is of value:

A basic knowledge of CW is of value for a variety of reasons, including:

- Operators sharing band (frequency) space may recognize basic international signals designed to prevent interference, such as "QRL" ("Are you (the frequency) busy? ").

- Under worst-case propagation conditions, operators may exchange basic emergency information. This is particularly true of low-power portable, mobile, or battery operated high frequency stations.

- Operators will have adequate knowledge of radiotelegraphy upon entering the Amateur Radio Service so that they may expand and develop the skill so as to support improved emergency communications and traffic handling on High Frequency circuits.

Ultimately, the existing telegraphy test requires a bare minimum of proficiency. The amount of time invested by the average applicant for an Amateur License to develop a 5 word-per-minute proficiency entails little more than a few evenings of effort. This does not seem to be an excessive request considering the many merits of the CW mode, a few of which are outlined above.

The members of the Michigan Net *strongly* support the retention of the 5 word-per-minute telegraphy exam for High Frequency access. If it is necessary to endorse an existing Rule Making Petition, we recommend the FISTS petition, RM-10811. By doing so, the Commission will be making a strong case for a survivable, public service oriented Amateur Radio Service.

Sincerely,

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